California ISO Convergence Bidding Project
Implementation Plan – Version 5
August 30, 2010
## Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.0</td>
<td>04/21/2010</td>
<td>Initial Draft Posted</td>
<td>Brian Holmes</td>
</tr>
</tbody>
</table>
| V2.0     | 06/01/2010 | • Updated OASIS Tech spec notes  
• Added relationship matrix to section 2  
• Added relationship matrix to section 3  
• Added verbiage on Bids characteristics in Section 3  
• Added clarifier to eligible locations in section 3  
• Added relationship matrix to section 8 and added clarifying language for convergence bid settlement at intertie locations  
• Added BPM section table to section 11  
• Updated training schedule in section 12  
• Remove CB only training from Deployment activities calendar in Appendix A  
• Updated Table 1 for market sim  
• Updated Table of Contents  
• Updated Charge Code List | Jim Staggs |
| V2.1     | 06/03/2010 | • Updated Bid Aggregation bid award | Jim Staggs |
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• Updated position limit information for intertie locations  
• Added description of suspension rules  
• Added CRR Settlement Rule and HASP Reversal Rule description  
• Updated list of impacted settlements charge codes  
• Updated Tariff schedule  
• Minor cleanup and clarifications | Brian Holmes  |
| V4       | 08/16/2010 | • Updated Market Simulation Plan section. | Jim Staggs |
| V5       | 08/30/2010 | • Added CRR Settlement Rule | Brian Holmes |
## Table of Contents

1. **INTRODUCTION** .......................................................................................................................... 1
2. **REGISTRATION PROCESS** ........................................................................................................ 2
3. **BIDDING** .................................................................................................................................. 4
   - NEW SIBR RULES .......................................................................................................................... 4
   - CONVERGENCE BID CHARACTERISTICS .................................................................................... 5
   - SIBR SCREENSHOTS .................................................................................................................... 5
   - ELIGIBLE LOCATIONS .................................................................................................................. 6
   - SUSPENSION ............................................................................................................................... 6
4. **TECHNICAL SPECIFICATIONS** ................................................................................................... 7
5. **AGGREGATION / DISAGGREGATION** ....................................................................................... 8
6. **AC SOLUTION / NODAL CONSTRAINT** ..................................................................................... 8
7. **BUSINESS REQUIREMENTS** ..................................................................................................... 9
8. **SETTLEMENTS** .......................................................................................................................... 9
   - NEW CHARGE CODES .................................................................................................................. 9
   - MODIFIED CHARGE CODES ...................................................................................................... 9
   - CRR SETTLEMENT RULE LOGIC .............................................................................................. 10
   - HASP REVERSAL SETTLEMENT RULE LOGIC .......................................................................... 13
9. **TARIFF** ..................................................................................................................................... 14
10. **TESTING AND MARKET SIMULATION** .................................................................................. 14
    - TESTING .................................................................................................................................... 14
    - MARKET SIMULATION .............................................................................................................. 15
11. **BPM UPDATES** ....................................................................................................................... 15
12. **TRAINING** ............................................................................................................................... 17
13. **DEPLOYMENT ACTIVITIES AND KEY MILESTONES** ........................................................... 18

**APPENDIX A: KEY DATES FOR CONVERGENCE BIDDING REGISTRATION** .................................. 1
**APPENDIX B: SIBR SCREEN CAPTURES** ....................................................................................... 1
1. Introduction

From 2006 through 2009 the California ISO conducted a comprehensive stakeholder process to further the goal of bringing Convergence Bidding into its wholesale markets.

Convergence Bidding is an important market enhancement that enables market participants to hedge their physical market positions and arbitrage differences between day-ahead and real time prices. This ultimately leads to better price convergence between these markets and more efficient dispatch of physical resources. Convergence bidding involves placing purely financial bids, sometimes called virtual bids, at particular pricing nodes in the Day-Ahead Market. If these bids are cleared in the Day-Ahead Market, they are then liquidated in the opposite position in the Real-Time Market. The market participant thus earns or is charged the difference between the day-ahead price and the real-time price at the location of the bid. Convergence bidding operates successfully in other independent system operators’ markets, and provides those markets with the benefits described above. In recognition of the importance of convergence bidding in the healthy functioning of a location marginal price (LMP) market, the Federal Energy Regulatory Commission (FERC) mandated that the California Independent System Operator Corporation (ISO) implement convergence bidding. Some market participants, however, are concerned about the possibility of market manipulation or negative reliability impacts if convergence bidding is implemented in our still-maturing LMP market. Through the multi-year stakeholder process, the ISO and market participants have carefully developed a conservative design proposal for the convergence bidding functionality that addresses these concerns.

The implementation of convergence bidding will:

- Enable more efficient market outcomes when market participants identify convergence bidding opportunities through more accurate market information;
- Minimize systematic differences between Day-Ahead and Real-Time prices reducing incentives for under or over-scheduling physical demand in the Day-Ahead Market;
- Enable suppliers to hedge against the possibility of a generator outage between Day-ahead and Real-Time, which may be particularly useful in peak conditions; and
- Increase market liquidity at all pricing locations, which help to discipline physical supplier market power.

Convergence bidding consists of the following key design elements:

- Convergence bidding at all internal pricing nodes, trading hubs, and at the interties;
- A registration process and a dynamic credit check for convergence bidders;
- Initial position limits, to be gradually phased out over time, reducing the megawatt amount of convergence bids that a market participant can place at any one pricing node;
- Stricter position limits and other safeguards at the interties to ensure reliability;
- Local market power mitigation, market monitoring tools, and the ability to suspend any convergence bidding that negatively impacts reliability;
- A settlement rule to deter adverse incentives tied to congestion revenue rights (CRR) and implicit virtual bidding at the interties; and
- A methodology for the allocation of market costs and grid management charges to convergence bidders.
This document is intended to provide participants additional information during the implementation phase. The contents are in draft form and will be finalized as part of the BPMs, Technical Specifications or other design documents. The information ultimately contained in BPMs, Technical Specifications or other formal documents supersedes any information contained in this implementation plan document. The ISO plans to issues updates to this document as implementation activities progress.

2. Registration Process

In order to participate in the Convergence Bidding process, a participant must register as a Convergence Bidding Entity (CBE). As the ISO requires the use of a certified Scheduling Coordinator (SC) to be eligible to submit bids in the ISO Day-Ahead market, each Convergence Bidding Entity will be required to designate a Scheduling Coordinator that will be authorized to execute Convergence Bidding transactions on its behalf. The SC designated may be an existing SC or the participant may certify a new SC by going through the SC Certification process.

To register as a CBE and be eligible to participate in market simulation or Production, participants will need to:

- Complete the Convergence Bidding Entity application
- Submit an affiliate disclosure form
- Identify SCID(s) that will be utilized
  - A CBE may use more than one SCID to submit Convergence Bids
  - An SCID may be associated with only one CBE
  - A parent SCID must be designated for credit checking¹
- Apply to become a certified SC, if necessary

The ISO will open the Convergence Bidding registration process on May 1, 2010. Due to the processes required to setup a CBE, the ISO needs to receive from participants all CBE registration materials by September 1, 2010 to ensure all configuration is completed in time for the start of market simulation on October 4, 2010.

In order to prepare for the implementation of Convergence Bidding, the ISO plans a code freeze on January 24, 2011. This code freeze includes a freeze in data updates to Master File. In order to ensure all required setup activities are completed in time for Go-Live, participants must submit all CBE registration materials by November 15, 2010. Additionally, there will be a 10 day period immediately following Go-Live during which the ISO will not be making any updates to Master File. The registration timeline is illustrated in Figure 1.

¹ The parent SCID is the SCID holds the collateral for a Scheduling Coordinator.
If a participant that is not a Scheduling Coordinator intends to certify a new Scheduling Coordinator for participation in market simulation, the materials must be submitted by June 1, 2010. If a participant that is currently a Scheduling coordinator plans to create a new SCID for market simulation, the existing process and requirements for requesting new SCID will apply. For more details, please see section 5 of the BPM for Scheduling Coordinator Certification and Termination which is posted on the ISO website at: [https://bpm.caiso.com/bpm/bpm/version/000000000000009](https://bpm.caiso.com/bpm/bpm/version/000000000000009).

As part of the registration process and in order to prepare participants for market simulation and implementation of Convergence Bidding, the ISO has scheduled a number of training courses. The ISO strongly encourages all participants planning to register as a CBE and/or participate in Convergence Bidding in the simulation or in production to attend these training courses. Please see section 12 for additional details on the Convergence Bidding training courses offered by the ISO.

**Table 1 – Relationship Matrix - General**

<table>
<thead>
<tr>
<th>Relationship Matrix</th>
<th>Affects Credit: Same as today</th>
<th>All child SCID’s roll up to a Parent SCID which holds all the credit collateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCID to Parent SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convergence Bidding Entity (CBE) to SCID</td>
<td>Affects Position Limits</td>
<td>Multiple SCID’s can be used by a single CBE. Position Limits will be evaluated at the CBE level</td>
</tr>
<tr>
<td>Signatory of the Convergence Bidding Entity (CBE) agreement to signatory of the Congestion Revenue Right (CRR) agreement (identified as the Company in this document)</td>
<td>Affects CRR Settlement Rule</td>
<td>All SCIDs of a Company which signs the CBE Agreement and which is also a CRR holder, will be subject to the CRR settlement rule. The relationship between the CBE and the CRR holder will be evaluated at the corporate entity signatory level of the CBE Agreement and CRR Agreement.</td>
</tr>
</tbody>
</table>
3. Bidding

Convergence Bids may be submitted by the designated SCIDs of a CBE. With the introduction of Convergence Bidding, additional SIBR rules will apply.

New SIBR Rules

The ISO intends to enforce position limits, which will be phased out over time, in SIBR during the initial implementation of Convergence Bidding. The Position Limit will be calculated as a percentage of the MW capacity at each eligible location. The position limits which the ISO plans to enforce during market simulation and for the initial Go-Live period are 10% for internal nodes and 5% for intertie nodes. Positions limits will not apply at the Trading Hubs or Default LAPs.

The ISO will perform the position limit calculation based on the highest MW point of a submitted bid curve. SIBR will enforce position limits at the CBE level. If a CBE uses multiple SCIDs, the highest MW point from the submitted bids of all SCIDs at a given location will be summed and evaluated relative to the position limit. The ISO will not net virtual supply and demand bids. SIBR will reject all convergence bids submitted by the SCIDs representing a CBE when a position limit is exceeded.

When a convergence bid is submitted to SIBR it will be sent to the ISO credit tracking system to ensure that a participant has sufficient credit to cover the potential liability. The potential liability will be calculated based on a reference price and the highest submitted MW point.²

Credit is evaluated and applied at the parent SC level for all SCIDs under that entity. If a bid is approved a portion of the posted credit for the parent SCID will be allocated to cover the potential liability. If there is no remaining credit available the bid will be rejected and a notice will be sent to the SCID through SIBR. If the bid is later rejected or is canceled it will be sent back to the credit management system for credit release.

Table 2 – Relationship Matrix – Bidding

<table>
<thead>
<tr>
<th>Relationship Matrix</th>
<th>Position limits</th>
<th>Credit limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convergence Bidding Entity (CBE) with multiple SCIDs</td>
<td>The sum submitted MWs of all SCIDs associated with a CBE “share” the position limit at any single location. Once the limit has been exceeded, ALL SCID convergence bids at the location will be rejected</td>
<td>Every bid or BATCH of convergence bids (CB) submitted will be evaluated for sufficient credit. If a bid or BATCH of CBs exceed the limit, the bid or batch of bids will be rejected based on last in, first out.</td>
</tr>
<tr>
<td>SCID to Parent SC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

² The reference prices will be posted on OASIS. Please see the technical specification described in Section 4 for additional details.
For interties, position limits are based on the Operational Transfer Capability (OTC) of the inter-tie constraint associated with the interties. In the case of multiple eligible pricing nodes related to the same intertie constraint in the physical market, the convergence bidding position limit for those nodes will be based on the OTC of the physical intertie constraint scheduling limit. For example, position limits for GONDER_2_N501, MARKETPL_5_N501 or MCCULLGX_5_N501 will be based on the OTC of ADLANTOSP_ITC.

Similar to internal nodes, SIBR evaluates each intertie convergence bid at the time of submission. However, the OTC can change from the time that an intertie convergence bid is submitted and deemed conditionally valid to the time of market close. A bid which is conditionally valid from a position limit perspective can be subsequently rejected if the OTC is later reduced. If the OTC is raised again before the market closes participants can re-submit bids but the ISO will not “reinstate” a bid once it is rejected.

**Convergence Bid Characteristics**

The SC for a CBE may submit supply or demand convergence bids at any eligible location subject to the position limits and credit limits described above and from which it is not suspended.

A Convergence Bid must contain:

- The SCID which is submitting the bid
- Start and Stop Date and Time in GMT
- Node ID for an eligible location
- A Bid Type of Supply or Demand
- An economic energy bid curve of no more than ten segments
  - For supply bids the bid curve must be monotonically increasing
  - For demand bids the bid curve must be monotonically decreasing

The SIBR artifacts for creating an XML Convergence Bidding Raw Bid are posted in the Technical Specifications section of the Convergence Bidding page. Participants will also be able to use the SIBR UI during market simulation and production to create convergence bids.

CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding > Convergence Bidding Technical Specifications

Convergence Bids may only be for energy – no start up cost or minimum load cost characteristics, Ancillary Service bids or RUC bids are permitted. Similarly, there are no inter-temporal constraints enforced for convergence bids. Convergence Bids must also be economic bids subject to the applicable bid cap and bid floor and may not be submitted as self-schedules. The minimum bid-segment length for a Convergence Bid is 1 MW.

**SIBR Screenshots**

SIBR will have some new functionality for SCs to enter and distinguish bids in the system. See Attachment B for SIBR Screenshots with the new Convergence Bidding attributes.
Eligible Locations

The ISO has defined eligible locations using the following criteria: submitted nodal convergence bids should align with physical injection and withdrawal characteristics of the ISO. Additionally, Convergence Bidding should be permitted at designated aggregated locations. Using the above criteria, the following nodes are eligible for convergence bids:

- The price node (Pnode) where a generator resides
- The price node (Pnode) where a generator delivers in the case of a Point of Delivery (POD)
- The aggregate pricing node (APnode) where physical generators schedule and are paid
- Any price node (Pnode) where load resides
- The three Default Load Aggregation Points (DLAPs)
- The three Trading Hub locations
- All intertie locations where participants can submit physical bids

Generators not located in the ISO Control Area deliver at intertie locations and do not have distinct Pnodes which are eligible for Convergence Bidding. Additionally, any location with a limit under one MW is not eligible since the minimum bid size is one MW. Any location with a physical limit between one MW and ten MWs will be treated as ten MWs for the purpose of enforcing position limits.

The ISO has posted a preliminary list of eligible locations for Convergence Bidding and the associated MW limits for position limit calculation. This information is only to assist market participants in creating bid sets in support of the ISO testing efforts and preparing for market simulation. The document is posted on the ISO website at: CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding

In market simulation and production the list of eligible locations for Convergence Bidding and the associated MW limits for Position Limit calculations will be maintained on OASIS. For additional details on the OASIS Atlas report, please refer to the OASIS design specification posted on the ISO website at: CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding > Convergence Bidding Technical Specifications

Suspension

As described in the ISO’s proposed Tariff language filed at FERC on June 25 the ISO may limit or suspend convergence bidding under certain circumstances. More specifically, the ISO may

- Limit convergence bidding participation by enforcing stricter position limits for a one or more SCIDs at one or more locations
- Suspend one or more otherwise eligible locations
- Suspend the ability of one or more SCIDs to submit convergence bids at one or more locations. This can include suspension of one or more SCIDs at all locations.
- Suspension of the convergence bidding market such that no SCIDs can submit convergence bids at any location.

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3 Applies to Dynamic System Resources and Resource Specific System Resources sometimes referred to as Tie Generators.
For additional information on the circumstances under which the ISO may limit or suspend convergence bidding please refer to the ISO FERC Tariff filing in Docket ER10-1559 which is posted on the ISO website. CAISO.com > Legal & Regulatory > FERC Filings > FERC Filings – 2010

4. **Technical Specifications**

The ISO has published XSDs, WSDLs and associated documentation for SIBR and CMRI to the CAISO website. The design of these artifacts parallel the existing design for physical bids, a preliminary set of specifications includes:

- **SIBR Technical Documents**
  - Submit CBRawBid
  - Submit CBBidAction
  - Retrieve CBBidResults
  - Retrieve CBCleanBid
  - SIBR Interface Specifications – Version 6
  - SIBR Business Rules for Bidding v4.0
  - Release Notes for SIBR Business Rules for Bidding v4.0

- **CMRI Technical Documents**
  - Retrieve CBAwards
  - CMRI Interface Specifications

- **OASIS Technical Documents**
  - OASISCBBid
  - OASISMaster
  - OASIS Report
  - OASIS API Specification Document

The OASIS specifications include reports for:

- Day Ahead Aggregate Convergence Bidding Awards
- Day Ahead Convergence Bidding Public Bids
- Reference Prices
- Pnode Listing (Update to an Existing Report)
- APnode Listing (Update to an Existing Report)
- Net Cleared Convergence Bidding Awards (Energy)
- Day Ahead Market Summary Report (Energy)

Pursuant to the Data Release 2 policy initiative approved by the ISO Board of Governors in February, 2010, there will be additional OASIS technical information posted. The ISO posted on May 11, 2010 updates to the OASIS API Specifications and OASIS Artifacts to meet the added reporting requirements.

The technical documentation is posted on the ISO Website at:
CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding > Convergence Bidding Technical Specifications
5. **Aggregation / Disaggregation**

As discussed with market participants through a series of Implementation Working Group conference calls in the fall of 2009, the ISO software has a limited bid-volume which can be received and processed. To mitigate the impact of this limitation on participants, the ISO will aggregate bids that come into SIBR from all SCs at who bid at a single location. A composite bid curve will be created. This bid curve will be used in the IFM optimization. Following the determination of the optimal solution, the ISO will disaggregate the awarded MWs back to the individual SCs. This is similar to the logic used on the interties.

For example, if three SCs submit Virtual Supply bids at the same node, the software will combine the bids into a single Virtual Supply bid prior to being used in the IFM.

- SC1 submits: (0,$25), (25,$32), (50,$35), (75,$37), (100,$37)
- SC2 submits: (0,$35), (50,$45), (100,$45)
- SC3 submits: (0,$30), (10,$35), (20,$45), (30,$47), (40,$47)

Continuing this example, the market program will combine these three individual bid curves into the following aggregated bid curve:

**Aggregate Bid Curve:** (0,$25), (25,$30), (35,$32), (60,$35), (145,$37), (170,$45), (230,$47), (240,$47)

The bid curve shown above will be used in the IFM. It represents the total virtual supply to be considered at the submitted node. Once the IFM clears, the CB awards will be sent to the individual participant based on their contribution to the cleared MWs.

To complete this example, assume the IFM cleared at $35 at this node for 130 MW. Any bid segments under $35 will clear. Since more than one participant submitted a $35 segment, and that segment is marginal, the MW at $35 will be awarded pro-rata among the participants. SC1 would receive 29.4% (25 MW/85 MW) of the pro-rata award, SC2 would receive 58.8% (50 MW / 85 MW) of the pro-rata award and SC3 would receive 11.8% (10 MW / 85 MW) of the pro-rata award.

**Final CB awards at the selected node:**

- SC1: 25 MW + 25 MW + (.294*70) = 70.58 MW
- SC2: (.588*70 MW) = 41.16 MW
- SC3: 10 MW + (.118*70 MW) = 18.26 MW

6. **AC Solution / Nodal Constraint**

The ISO software is designed to obtain an AC power flow solution. The implementation of convergence bidding does not alter this approach. However, as discussed with market participants through a series of Implementation Working Group conference calls in the fall of 2009, the implementation of Convergence Bidding has the potential to allow participants to submit bids for higher levels of injection or withdrawals than can be supported by the physical infrastructure. To ensure that these bids do not prevent the ISO from achieving an AC solution, a nodal constraint will be added to the IFM.

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4 Working Group presentations are posted at [http://www.caiso.com/241e/241e6f6335bc0.html](http://www.caiso.com/241e/241e6f6335bc0.html)
5 Working Group presentations are posted at [http://www.caiso.com/241e/241e6f6335bc0.html](http://www.caiso.com/241e/241e6f6335bc0.html)

The presentation is posted at the ISO website at:
CAISO.com > Operations Center > Workshops and Forums > Market Performance and Planning Forum

7. Business Requirements

The ISO has posted an updated external version of the Business Requirements Specification (BRS) document to the website. The BRS describes the additional business-level detail on the functionality that the ISO is building.

The updated version of this document includes requirements associated with the additional policy elements approved by the ISO Board of Governors in February 2010. These initiatives include new settlement rules for e-tagging, Make Whole payment methodology for Ex-post price corrections affecting accepted virtual bids, and two additional public reports showing nodal net position limits and a market summary report. Additionally, the ISO has updated this document to correct minor errors.

The external BRS is posted on the ISO Website at:
CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding

8. Settlements

Convergence Bidding will have the following impacts on settlements.

New Charge Codes

These charges will be created:

- CC6013: Day Ahead Settlement – the equivalent of 6011 for CB – a new charge code
- CC6473: Real Time Settlement – the Real time liquidation of the DA Award – the equivalent of 6475 for CB – a new charge code
- CC6053: Real Time Settlement (liquidation) on the Interties (HASP) the equivalent of 6051 for CB – a new charge code
- CC6703: New charge code for the CRR settlement rule implementation
- 2 new GMC charge code associated with CB
  - CC4533: GMC for scheduling
  - CC4520: Transaction Fee

Modified Charge Codes

These charges will be modified:

- CC6947 – IFM Marginal Surplus
- CC6636 – IFM Tier 1 Allocation
- CC6806 – RUC Tier 1 Allocation
- CC6700 – CRR Hourly settlement
- CC6790 – CRR Balancing Account
- CC6774 – RT congestion offset
- CC6477 – RT Energy offsets
- CC6678 – Real Time Bid Cost Recovery Allocation
- CC6051 – HASP Energy, Congestion, and Loss

The following is the schedule for Settlement related items:
- Configuration Guides – Expected Posting date of September 22, 2010
- DRAFT Configuration Output file – Expected posting date of October 1, 2010
- BD Matrix – Expected posting date of October 1, 2010
- Initial Settlements Simulation – Statements for the week of December 6, 2010

All Convergence Bids which are submitted at intertie locations will be liquidated at the HASP price in charge code 6053. Though some physical resources outside the ISO Control Area may deliver to the intertie locations on a Real-Time basis, such as a Dynamic System Resource or a resource which is dispatched for A/S, all convergence bids awarded at an intertie location will be liquidated against the HASP price.

**CRR Settlement Rule Logic**

<table>
<thead>
<tr>
<th>Relationship Matrix</th>
<th>CRR Settlement Rule</th>
<th>All SCIDs of a CBE will be evaluated in the CRR settlement rule with all the SCIDs of a CRR holder of the same company who signed the agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signatory company of the Convergence Bidding Entity (CBE) agreement to signatory company of the Congestion Revenue Right (CRR) agreement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Company may be subject to the CRR Settlement Rule if the SCIDs which it uses for convergence bidding at individual nodes enhances the returns to the CRR portfolio held by its SCIDs. The CRR Settlement Rule will first evaluate the flow impact on binding constraints of all the SCIDs which belong to the Company. If this impact is significant, the rule will compare the Day-Ahead market results with the Real-Time market results. If the change in Day-Ahead flows caused by a convergence bidder increase the value of the Company’s CRR portfolio netted across the off-peak or on-peak periods, a charge will be assessed to offset this increase.

Some items to note:
- A Company may use multiple SCIDs to submit Convergence Bids. It is the joint impact on Day-Ahead flows which are evaluated.
- A Company may use multiple SCIDs to hold CRRs. It is the net increase which is considered.
- Certain thresholds must be met before the rule is triggered.
- Convergence Bids submitted at the Default LAPs or the Trading Hubs are not considered.
- The CRR Settlement Rule can never be a credit.
- The CRR Settlement Rule is evaluated on a constraint by constraint basis.
It is possible for the CRR Settlement Rule charge to exceed the amount a participant receives in CRR Revenue for each Trading Day for the set of hours identified as on-peak or off-peak periods.

Since the ISO does not pay or charge Companies, only the SCIDs which a company uses, the ISO will allocate the Company level charges to the SCIDs which hold CRRs. Since these entities may be distinct from the SCIDs which submitted the convergence bids, the ISO will provide the SCIDs who submitted any relevant convergence bids – but no other information on the convergence bids themselves – to the CRR holding SCIDs. The ISO will provide the convergence bidding SCIDs with information on the relevant convergence bids as well as the SCIDs for any relevant CRR holders.

**CRR Settlement Rule Example**
The purpose of this example is only to further illustrate the CRR Settlement Rule concept, provide information on the data that will be available to participants and identify the source system for this data. As noted, the Settlements Configuration Guides will be published on September 22. An update to the CMRI Technical Specification document will be published on September 22 which will provide additional details on the CMRI reports which will contain supporting data. These documents supersede any information contained in this simple example. For additional information on the calculation logic, please refer to the External Business Requirements, Appendix B.

Assume a simple system illustrated in Figure 2.

**Figure 2 – Sample System for CRR Settlement Rule Example**

![Sample System for CRR Settlement Rule Example](image)

### Example Assumptions
- Company P executes the CRR Agreement and holds CRRs with SC1
- SC1 owns a 20 MW Off-Peak CRR with a Source of Node A and a Sink of Node B
- Company P executes the CBE Agreement and designates SC2 for CB transactions
- SC2 receives a 15 MW virtual award at Node A in hours 2 and 3
- Constraint A-B is binding from A to B in the Day-Ahead Market
- Constraint A-B is not binding in the Real-Time Market
- Neither Node A or B are intertie locations

SC1 would be subject to the CRR Settlement Rule and would see an adjustment in charge code 6703 in its settlements statement. For the purposes of this simplified example, the general concept of the calculation is:

\[
\text{Settlement Amount} = \text{Individual Amount} \times \text{Percent Share} \\
\text{Percent Share} = \frac{\text{Sum Positive Company Amount}}{\text{Sum Total Company Amount}}
\]
Individual Amount = Sum[CRR MWs * Hourly Price]

Table 4 – Sample Values Contained in SC1’s Settlement Statement

<table>
<thead>
<tr>
<th>Category</th>
<th>Example Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settlement Amount (Off Peak)</td>
<td>$18</td>
</tr>
<tr>
<td>Individual Amount</td>
<td>$18</td>
</tr>
<tr>
<td>Sum Positive Company Amount</td>
<td>$18</td>
</tr>
<tr>
<td>Sum Total Company Amount</td>
<td>$18</td>
</tr>
<tr>
<td>SCIDs with CRRs for Netting</td>
<td>SC1</td>
</tr>
<tr>
<td>SCIDs receiving Virtual Awards</td>
<td>SC2</td>
</tr>
</tbody>
</table>

Since SC1 is the only CRR Holding SCID under Company P, there are no additional SCID with which to net the charges.

SC1 would also have access to a CMRI report which would show the price charged by Constraint, by CRR ID, by Hour. A sample is presented in Table 5. The CRR MWs can be derived from SC1’s CRR Inventory Report.

Table 5 – Sample CMRI Report for SCID Holding CRRs

<table>
<thead>
<tr>
<th>Constraint</th>
<th>CRR ID</th>
<th>Hour Ending</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line A-B</td>
<td>123456</td>
<td>2</td>
<td>$0.35</td>
</tr>
<tr>
<td>Line A-B</td>
<td>123456</td>
<td>3</td>
<td>$0.55</td>
</tr>
</tbody>
</table>

The charge assessed on SC1 will be $18 = (20 MWs * $0.35) + (20 MWs * $0.55)

There will be no CRR related settlement for SC2 since SC2 does not own CRRs. However, SC2 will receive supporting details in two CMRI reports. Since SC1 will be informed that the CRR adjustment is due to SC2 in its settlements statement and both SCIDs are under the same Company, they can coordinate to determine the Virtual Awards which caused the CRR Settlement Rule adjustment. A sample of this report is shown in Table 6.

Table 6 – Sample Award Location CMRI Report for SCID Receiving Virtual Award

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Hour Ending</th>
<th>Node</th>
<th>Physical Reduced in HASP?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line A-B</td>
<td>2</td>
<td>Node A</td>
<td>N</td>
</tr>
<tr>
<td>Line A-B</td>
<td>3</td>
<td>Node A</td>
<td>N</td>
</tr>
</tbody>
</table>

SC2 received virtual awards at Node A which caused the CRR Settlement Rule adjustment to apply to SC1. This report will only contain locations which are related to the CRR Settlement Rule adjustment. Note that no MW information is contained in this report. The MW information associated with Virtual Awards is contained in a separate CMRI report available to SC2. The technical specifications for this
The ISO will post additional technical documentation on the CRR Settlement Rule in September. Please see Appendix B of the External BRS for additional details on the calculation logic. Example scenarios are also included in the ISO training on Convergence Bidding.

CAISO.com > Participation > Training
CAISO.com > Initiatives & Meetings > Current Initiatives > Convergence Bidding

**HASP Reversal Settlement Rule Logic**

With the introduction of Convergence Bidding, the ISO is implementing a settlement rule designed to reduce the incentive for implicit virtual bidding on the interties. Day-Ahead intertie awards which are not tagged and which are then reduced in HASP may be subject to the HASP Payment Reversal Rule.

The HASP Payment Reversal Rule creates a charge that offsets any profit which is obtained by reducing an untagged Day-Ahead schedule in HASP. The key criteria are that the HASP award is lower than the Day-Ahead award, the Day-Ahead award is not completely tagged and the LMP changes such that this reduction is profitable.

For example,
- SC1 receives a 10 MW Day-Ahead import award at Malin; LMP = $50
- SC1 tags 7 MW
- SC1 reduces schedule to 4 MW in HASP; LMP = $40

In this case, SC1 will be subject to a 3 MW HASP Payment Reversal at a price of $10. This simple example only illustrates the HASP Payment Reversal principle. Detailed documentation will be posted in September.

For more information on the HASP Payment Reversal policy, please refer to the e-Tagging Timing Requirements.

CAISO.com > Initiatives & Meetings > Current Initiatives > e-Tagging Timing Requirements

---

Table 7 – Sample Flow CMRI Report for SCID Receiving Virtual Award

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Hour Ending</th>
<th>Total Flow (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line A-B</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Line A-B</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>
9. **Tariff**

The ISO filed the Convergence Bidding Tariff on June 25, 2010 in Docket ER10-1559. Several parties submitted a Comment or Protest.

**Upcoming Tariff Related Milestones:**
- ISO Response to Protests – 8/2
- Anticipated FERC Order – October 17

No additional Tariff related stakeholder calls or workshops are planned at this time.

10. **Testing and Market Simulation**

The ISO will do internal testing and conduct a thorough market simulation for registered market participants. Market participants must be registered to be a Convergence Bidding Entity in order to participate in the market simulation.

**Testing**

The ISO will test the new and affected systems, processes, and reports affected by the implementation of convergence bidding. The ISO plans to publish a report on IFM testing activities before Market Simulation.

To ensure that this testing effort is robust and realistic, the ISO requested that any entity planning to participate in convergence bidding provide two Convergence Bidding bid sets for use in testing by July 1, 2010.

- **Base CB Participation** – this bid set is requested to be generally representative of the participants planned activities in terms of the count of bids and MW volumes submitted.
- **High CB Participation** – this bid set is requested to be generally representative of a maximum count of bids and MW volumes that a participant might submit.

Several market participants responded to the ISOs request. The ISO has evaluated the bids received and has begun testing activities. The ISO sincerely appreciates the support of the market participant community in the testing of convergence bidding.

The provided Convergence Bidding bid sets are subject to the same confidentiality rules associated with real bids, will be used only in the ISOs testing efforts and will not be published or used to establish any expectation on how or where a participant will submit bids during market simulation or in production. The ISO is not requesting that participants provide any information on bidding strategies or other information that the participant considers proprietary. The ISO will also supplement or modify the provided Convergence Bidding bid sets as necessary and also will include physical bid sets in testing. It is not necessary to provide a bid set for physical transactions.

The XSDs and WSDLs for CBRawBid were posted on the CAISO website on March 30. The ISO would appreciate participants submitting the sample bid sets using this format. Please see Section 4 for additional details.
Additional details on the process for submitting sample bid sets will be provided at the April 27 Market Performance and Planning Forum.

**Market Simulation**

The ISO has defined a set of preliminary scenarios for market simulation:

- Connectivity testing from market participant interfaces to ISO Market interfaces (API and GUI)
- SIBR simulation for bid validation
- SIBR simulation for position limits and credit
- SIBR and IFM to CMRI – show awards are correctly calculated when there are multiple identical segments for a several bidders at nodes; structured testing
- Sizing and performance – stress cases for SIBR and IFM powerflow
  - Performance on credit checking
  - Performance on bid aggregation / disaggregation
  - Performance on AC powerflow and nodal constraint application
- Settlements Flow
- CRR Settlement Rule – test market settlements and DMM functionality
- Mini Monthly Settlements Statement (5 day process for monthly calculations)

The ISO published a Market Simulation Plan on August 16 which contains a detailed schedule and a description of simulation scenarios. The Convergence Bidding Market Simulation Plan can be found at: [http://www.caiso.com/23ad/23ade49d4790.html](http://www.caiso.com/23ad/23ade49d4790.html)

### 11. BPM Updates

The following matrix outlines the BPMs and sections that have been identified as impacted by the Convergence Bidding Project. Additional impacts may still be identified and will be added to the change list. The BPM draft language is anticipated to be available in September.

**Table 8 – Preliminary List of Planned BPM Updates**

<table>
<thead>
<tr>
<th>Topic</th>
<th>BPM</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3. Overview of Market Instruments</td>
</tr>
<tr>
<td>Treatment of Virtual Bids in the Market System</td>
<td>Market Operations</td>
<td>6.4. CAISO Activities</td>
</tr>
<tr>
<td>Achieving an AC solution</td>
<td>Market Operations</td>
<td>6.6.2. IFM constraints and activities</td>
</tr>
<tr>
<td>Aggregation of Bids in the DAM processes</td>
<td>Market Operations</td>
<td>6.4. CAISO Activities</td>
</tr>
<tr>
<td>Submitting Bids into SIBR</td>
<td>Market Instruments</td>
<td>3. Overview of Market</td>
</tr>
</tbody>
</table>
### Convergence Bidding Implementation Plan

#### Topic | BPM | Section
------- | ---- | -------
Interactions with the Credit system from SIBR | Market Instruments | 8. Bid Submission & Validation
Position Limits | Market Instruments | 8. Bid Submission & Validation Attachment A (SIBR BR)
Binding constraints on an interties with Virtual Bids | Market Operations | 6.6.2. IFM Constraints and Activities
Suspending Virtual Trading | SC Certification and Termination | Section 6.2. Termination
Position Limits | Market Operations | 6.1.4. CAISO Activities
CRR Settlement Rule | Congestion Revenue Rights Market Operations | section 1.3-reference to MO’s BPM8.3 Convergence Bidding CRR Settlement Rule
CRR settlement rule on physical intertie bids | Market Operations | 8.3. Convergence Bidding CRR Settlement Rule
HASP Reversal Rule – tagging requirements | Market Operations | 8.2. Convergence Bidding HASP Reversal Rule
CMRI Changes | Market Instruments | 10. CMRI
OASIS Changes | Market Instruments | 12. OASIS
Make Whole payments due to price corrections for Virtual Bids | Market Operations | Appendix E
SC certification for Convergence Bidding Entities | SC Certification and Termination BPM | Section 2. Entities that require SC Representation Section 3. Types of activities or representation Section 5.3.7. Complete Real Time and Contact Drills Section 5.3.8. Submit SC emergency plan

The tentative schedule for updating BPMs is presented in Table 6.

**Table 9 – Preliminary BPM Update Schedule**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post New PRR addressing CB</td>
<td>September 22, 2010</td>
</tr>
<tr>
<td>Monthly BPM web conference</td>
<td>October 13, 2010</td>
</tr>
<tr>
<td>Final approval of CB BPM language</td>
<td>January 4, 2011</td>
</tr>
</tbody>
</table>

BPM Updates will follow the Proposed Revision Request (PRR) process.
12. Training

The ISO has scheduled six Convergence Bidding training courses and three SC Certification training courses between June and December. If a participant plans to create a new SCID for market simulation, the existing SC training requirements apply.

Table 7 shows the scheduled Convergence Bidding and SC Certification training sessions for 2010. Each course is offered multiple times to offer participants several opportunities to receive the recommended training. A participant only needs to attend one session of each applicable course.

Table 10 – Scheduled Training

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>June 14-16, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>June 30, 2010 Canceled</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>July 13, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>July 16, 2010 Houston, TX</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>Aug 12, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>Aug 24, 2010 Portland, OR</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Sept 13-15, 2010</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Sept, 22, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>October 7, 2010 Southern CA</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Oct 20, 2010</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Nov 17, 2010</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Dec 6-8, 2010</td>
</tr>
</tbody>
</table>

All training courses listed in Table 7 will take place at the ISO unless otherwise noted. The ISO will consider additional training sessions in other locations based on participant interest.

Please go to for a complete schedule:
CAISO.com > Participation > Certification Processes > Convergence Bidding
Or
CAISO.com > Participation > Training > Customer Training Catalog
13. Deployment Activities and Key Milestones

Table 8 contains some key milestones.

Table 11 – Key Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Requirement Specifications Published</td>
<td>March 23, 2010</td>
</tr>
<tr>
<td>Draft Tariff Language Posted</td>
<td>March 23, 2010</td>
</tr>
<tr>
<td>Technical Specifications Published</td>
<td>March 31, 2010</td>
</tr>
<tr>
<td>Stakeholder Meeting – Proposed Tariff Review</td>
<td>April 19, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Registration Begins</td>
<td>May 1, 2010</td>
</tr>
<tr>
<td>Tariff Filed with FERC</td>
<td>May 27, 2010</td>
</tr>
<tr>
<td>Complete submittal of SC registration materials to register as new SC for Market Simulation</td>
<td>June 1, 2010</td>
</tr>
<tr>
<td>Complete submittal of CBE registration materials for Market Simulation</td>
<td>September 1, 2010</td>
</tr>
<tr>
<td>Settlement Configuration Guides Posted</td>
<td>September 22, 2010</td>
</tr>
<tr>
<td>Market Simulation begins</td>
<td>October 4, 2010</td>
</tr>
<tr>
<td>Market Simulation Test Break - Implement Patches (Holiday)</td>
<td>December 20, 2010</td>
</tr>
<tr>
<td>Code Freeze – Market Simulation Ends</td>
<td>January 24, 2011</td>
</tr>
<tr>
<td>Go Live</td>
<td>February 1, 2011</td>
</tr>
</tbody>
</table>
# Appendix A: Key Dates for Convergence Bidding Registration

<table>
<thead>
<tr>
<th>Description of Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last date to submit an SC application and application fee for SC certification to register a new SC in time for the beginning of a Convergence Bidding Market Simulation</td>
<td>June 1, 2010</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>June 14-16, 2010</td>
</tr>
<tr>
<td>Last date to submit materials to register as a CBE for the ISO to complete all processing for the designated SC for participation in Market Simulation when it initially opens</td>
<td>Sept 1, 2010</td>
</tr>
<tr>
<td>ISO can begin sending out Convergence Bidding Agreements based on acceptance by FERC and completion of requirements by each registrant</td>
<td>Sept 1 - Dec 1, 2010</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Sept 13-15, 2010</td>
</tr>
<tr>
<td>Last date for SC applicants to complete all SC certification requirements to participate in Convergence Bidding at Go Live</td>
<td>Nov 15, 2010</td>
</tr>
<tr>
<td>Last date for participants to submit an application to become a CBE to be eligible to participate in Convergence Bidding at go live, including the Affiliate form and any changes to registration form</td>
<td>Nov 15, 2010</td>
</tr>
<tr>
<td>Last date to submit requests for additional SCIDs for Convergence Bidding for Go Live</td>
<td>Nov 15, 2010</td>
</tr>
<tr>
<td>ISO continuing to send out Convergence Bidding Agreements as requirements are completed</td>
<td>Sept 1 - Dec 1, 2010</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Dec 6-8, 2010</td>
</tr>
</tbody>
</table>

Entities not certified as a Scheduling Coordinator may use a Scheduling Coordinator already certified with the ISO to submit convergence bids on their behalf. The Scheduling Coordinator must be indicated on the Convergence Bidding Registration Form along with the letter from the SC for Convergence Bidding Financial Acceptance.

Entities being certified as Scheduling Coordinators for Convergence Bidding only (non physical bidding/financial only) are not required to perform the real time Grid Operations test as part of the SC Certification requirements.
Appendix B: SIBR Screen Captures

Choosing Bid Type

![Convergence Bid Summary](image)
Choosing Bid Location

![Convergence Bid Summary](image-url)
### Validating/Look Up Node Limit

![Image of Convergence Bidding Implementation Plan](image_url)

**Limit Values**

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRICO_7_B1</td>
<td></td>
</tr>
</tbody>
</table>

**Version 2**

Appendix B Page 3

June 1, 2010
Submitting Convergence Bid

Bid information represents test data and is shown for illustrative purposes only.
Bid Status with Credit System Validation

Bid Status

Valid

Invalid

Bid Credit Status

- None
- Pending
- Approved
- Disapproved
- Error